**Supplementary Methods**

Publications

Three previously published articles for studycovering different facets of gastroenterology were chosen based on their clinical significance and potential impact on the scientific community and general population. These included:

A. Imperiale TF, Ransohoff DF, Itzkowitz SH, Levin TR, Lavin P, Lidgard GP, Ahlquist DA, Berger BM. Multitarget stool DNA testing for colorectal-cancer screening. *N Engl J Med*. 2014 Apr 3;370(14):1287-97. doi: 10.1056/NEJMoa1311194. Epub 2014 Mar 19. PMID: 24645800. Online publication date: March 19, 2014.1

B. Pimentel M, Lembo A, Chey WD, Zakko S, Ringel Y, Yu J, Mareya SM, Shaw AL, Bortey E, Forbes WP; TARGET Study Group. Rifaximin therapy for patients with irritable bowel syndrome without constipation. *N Engl J Med*. 2011 Jan 6;364(1):22-32. doi: 10.1056/NEJMoa1004409. PMID: 21208106. Online publication date: January 6, 2011.2

C. Gomm W, von Holt K, Thomé F, Broich K, Maier W, Fink A, Doblhammer G, Haenisch B. Association of proton pump inhibitors with risk of dementia: A pharmacoepidemiological claims data analysis. *JAMA Neurol.* 2016 Apr;73(4):410-6. doi: 10.1001/jamaneurol.2015.4791. PMID: 26882076. Online publication date: February 15, 2016.3

The total number of views following online publication date was determined using the metrics of publication page views at 7-days and 30-days post-publication where this was available by the journal1,2 or monthly page views post-publication.3 Page view data is collected daily and includes views of the article in the both html and PDF versions. Additionally, we captured the following metrics from the date of publication to the present time (4/25/21): total page views, media coverage, and social media metrics provided by the journals and the number of publication citations reported by Google Scholar. The Altmetric data for the three publications was provided to complement traditional citation impact metrics.4

Google Trends Search

Google Trends (trends.google.com) was used to access search requests made by individuals on Google Search.5 The relevant Google Trends search terms and time period for each variable of interest and publication are summarized in **Supplementary Table 1.**  The Google Trends output, referred to as the relative search volume (RSV), has numbers 0-100 which represents search interest for a term in a particular week relative to the week with the highest numbers of searches for a selected region and time period.5,6 A value of 100 indicates peak popularity for the term and 0 means insufficient data. The Google Trends search for each search term was limited to United States. For each article, the terms were searched 12 months before and after the online publication date. The weekly search data for each search term was extracted for the 24-month study period and downloaded for additional analyses. The Google Trends search of the various search terms was performed on March 11, 2021. The variables of interest for each article are summarized in **Supplementary Table 1** and included diagnoses, medications, tests, and procedures relevant to these publications.

Target Population: Rochester Epidemiology Project

The REP is a collaboration of clinics, hospitals, and medical facilities in Minnesota and Wisconsin that share their medical records for research7,8 including a linked database of medical information for all residents of Olmsted County, Minnesota (Mayo Clinic, Olmsted Medical Center, and Rochester Family Medicine Clinic).7 The REP contains data on patient demographics, medical diagnostic codes, and surgical procedures and includes all paper and electronic records for each resident in the county.7 We accessed the REP data for the variables of interest for Olmsted County to gather regional, population-based data for this community. Consistent with the Google Trends search time period, REP data was acquired for a 24-month period, consisting of 12 months before and after the article online publication date.

Search Directed Medical Outcomes in the Rochester Epidemiology Project

Medical diagnoses/medications/tests/procedures were identified using the appropriate disease and procedural codes. In the REP, medical diagnoses were identified using the appropriate International Classification of Diseases (ICD) codes (IBS, ICD-9 564.1; diarrhea ICD-9 787.91; GERD ICD-9 530.81 and ICD-10 K21.0, K21.9; dementia ICD-9 290. 290.2, 294.1, 294.11, 294.2, 294.21, 294.8, 294.9, 331, 331.19, 331.2, 331.3, 331.4, 331.5, 331.6, 331.7, 331.82, 331.83, 331.9, and ICD-10 F01.50, F01.51, F02.80, F02.81, F03.90, F03.91, F05, G30.1, G30.9, G31.83). Medications prescriptions (rifaximin, proton pump inhibitors, H2 blockers) were identified using medication prescription codes. Multitarget stool DNA test (Cologuard) was identified using Current Procedural Terminology (CPT) code 81528 and using Mayo specific lab codes. Colonoscopy procedures were identified using a combination of CPT (44388, 44389, 44394, 44402, 45300, 45330, 45331, 45332, 45333, 45334, 45335, 45337, 45338, 45339, 45340, 45341, 45342, 45345, 45347, 45349, 45350, 45378, 45379, 45380, 45381, 45382, 45383, 45384, 45385, 45386, 45387, 45388, 45389, 45390, 45391, 45392, 45393, 45398, G0104,G0105, G0121) and ICD codes (ICD-9 45.22, 45.23, 45.24, 45.25, 45.25/3, 45.42, 45.43; ICD 10 0DJD8ZZ).

Only adult patients (age ≥18 years) were included for all variables, apart from colonoscopies where adults ≥50 years of age were included to best capture patients undergoing colon cancer screening. For medication prescriptions, each patient that filled a prescription for a particular medication was counted once in the year preceding and once in the year following the article online publication date, respectively, regardless of whether they filled one prescription or more during this time. This was done to avoid overrepresenting certain patients that filled their prescriptions monthly rather than yearly.

The REP medical record linkage system, which contains the medical records for all residents of Olmsted County, Minnesota, is a powerful established and robust tool that allowed us to study local, population-based, healthcare utilization trends. The REP captures virtually all residents of these counties, regardless of age, sex, ethnicity, disease, socioeconomic, or insurance status and has been consistently used to conduct population-based studies.

Statistical analysis

Google Trends data as well as Olmsted County prescriptions/visits/tests/procedures data were retrieved for the year prior to and the year after the high impact publication date, on a weekly basis. The weekly data were fit to a family of linear models to test whether either the mean level or the trend (or both) of either “hits” or prescriptions changed from before to after the publication date. Specifically, a two segment (pre- and post-publication) linear model for Y as a function of week was fitted. The first and most comprehensive model (Model 1, **Supplementary tables 2-4**) allowed for an intercept and slope pre-publication as well as an entirely different slope and intercept post-publication. This model allowed for both a vertical shift (change in intercept) at the publication date and a change in slope post-publication. The vertical shift parameter tests for an immediate shift up or down in the data with publication while a change in slope tests for a more gradual association over the weeks from publication on the measurement variable by either an increased or decreased trend with time. A significant change in the vertical shift parameter was considered an “immediate” change at publication while a significant change in slope was considered a “steady” change.

The overall F-statistic, providing a two degree of freedom test of no shift and no change in slope with publication, was calculated by subtracting the sum of squares of the full (4-parameter) and reduced (2-parameter) models, dividing by 2, and dividing by the mean squared error of the full model.

Two additional models were examined, one allowing for only a change in the slope post-publication (assuming no vertical shift) (Model 2, **Supplementary tables 2-4**)and a third model allowing for only a vertical shift at publication (assuming no change in slope at publication) (Model 3, **Supplementary tables 2-4**). The t test was used to test for no change in slope and no vertical shift respectively, and was obtained directly from the regression model output.

Data for Google Trends and REP was reported along with the standard error (SE). The ‘change in’ the variables of interest is shown using the symbol Δ followed by the unit of measurement. The alpha-level was set at 0.05 for statistical significance. The study was approved by the institutional review boards at Mayo Clinic and Olmsted Medical Center.

**References**

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